

REMARKS

Applicants respectfully request reconsideration and allowance of the subject application in view of the following remarks.

Claims 1-14 and 28-33 are pending in the application.

§ 103 Rejections

1. **Claims 1, 2, 4, 11, 12, 28, 29, and 31** were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,636,929 B1 (Frantz et al.) in view of IBM Technical Disclosure, "Multiple Control Unit/Device Emulator for Testing Computer Programs" (IBM Technical). This rejection is respectfully traversed, because (i) assuming, for the sake of argument, that there is motivation to combine the cited references, the combination still lacks important features of the claimed invention, and (ii) there is no motivation to combine the cited documents as proposed in the Office Action.

(i) **The Frantz et al. patent, even as modified by IBM Technical, still lacks important features of independent claims 1 and 28.** To establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP § 2143. As discussed below, Frantz et al. and IBM Technical, whether taken alone or in combination (assuming, for the sake of argument, that they can even be combined), fail to disclose important features of independent claims 1 and 28. Accordingly, claims 1 and 28 are allowable over the cited documents.

Independent claim 1 is directed to a test system for testing an in-test host's support of USB peripherals and recites, among other things, "a network interface configured to communicate with a peripheral emulator using a network communications protocol" and "operating logic configured to perform actions comprising: ...sending the received USB command messages to the peripheral emulator through the network interface using the network communications protocol; and receiving USB response messages from the peripheral emulator through the network interface using the network communications protocol"

Frantz et al. is directed to USB virtual devices and discloses a system in which a personal computer couples to a management sub-system via a USB bus, and the management sub-system couples to a management console via a suitable connection, so that input/output devices and peripherals at the management console appear as input/output devices and peripherals of the personal computer or server being managed. (col. 1, lines 25-32). In this manner, the server sends and receives data from the peripherals at the management console, as if the peripherals were locally connected to the server (Abstract; col. 4, lines 42-47). However, as acknowledged in the Office Action, Frantz et al. fails to disclose or suggest, among other things, "a network interface configured to communicate with a peripheral emulator using a network communications protocol," and "operating logic configured to perform actions comprising: ...sending the received USB command messages to the peripheral emulator through the network interface using the network communications protocol; and receiving USB response messages from the peripheral emulator through the network interface using the network communications protocol," as presently recited in independent claim 1.

IBM Technical discloses a microprogram “for converting a small central processing unit into a device for emulating multiple input/output devices and associated control units.” According to IBM Technical, “such an emulation capability allows the emulator to be attached to a central processing system for testing the system itself, and for testing computer programs for the system without the necessity of physically attaching the input/output devices and employing people to operate those devices,” and “provides the capability for testing programs which drive currently unavailable devices.” (IBM Technical, lines 1-7.) However, IBM Technical is silent as to “sending the received USB command messages to the peripheral emulator through the network interface using the network communications protocol; and receiving USB response messages from the peripheral emulator through the network interface using the network communications protocol ...,” as presently recited in independent claim 1.

Thus, even if, for the sake of argument, the Frantz et al. reference could be modified by the teachings of IBM Technical, the resulting system still would lack the features of Applicants’ claim 1 of “sending the received USB command messages to the peripheral emulator through the network interface using the network communications protocol; and receiving USB response messages from the peripheral emulator through the network interface using the network communications protocol” Accordingly, claim 1 is allowable over the Frantz et al. and IBM Technical documents.

Independent claim 28 is directed to a method of testing an in-test host’s support of USB peripherals and recites, among other things, “sending the command data packets to one or more peripheral emulators over network communications media” and

“receiving response data packets from the one or more peripheral emulators over the network communications media ...”

As discussed above, Frantz et al. discloses a system in which the server sends and receives data from the peripherals at the management console, as if the peripherals were locally connected to the host computer (Abstract; col. 4, lines 42-47). However, as acknowledged in the Office Action, Frantz et al. fails to disclose or suggest, among other things, “sending the command data packets to one or more peripheral emulators over network communications media” or “receiving response data packets from the one or more peripheral emulators over the network communications media,” as presently recited in independent claim 28.

Also as discussed above, IBM Technical discloses a microprogram “for converting a small central processing unit into a device for emulating multiple input/output devices and associated control units.” According to IBM Technical, “such an emulation capability allows the emulator to be attached to a central processing system for testing the system itself, and for testing computer programs for the system without the necessity of physically attaching the input/output devices and employing people to operate those devices,” and “provides the capability for testing programs which drive currently unavailable devices.” (IBM Technical, lines 1-7.) However, IBM Technical is silent as to “sending the command data packets to one or more peripheral emulators over network communications media” or “receiving response data packets from the one or more peripheral emulators over the network communications media,” as presently recited in independent claim 28.

Thus, even if, for the sake of argument, the Frantz et al. reference could be modified by the teachings of IBM Technical, the resulting system still would lack the features of Applicants' claim 28 of "sending the command data packets to one or more peripheral emulators over network communications media" and "receiving response data packets from the one or more peripheral emulators over the network communications media" Accordingly, claim 28 is allowable over the Frantz et al. and IBM Technical documents.

Dependent claims 2, 4, 11, 12, 29, and 31 depend from claim 1 or claim 28 and are allowable by virtue of this dependency, as well as for the additional features that they recite.

For example, **dependent claim 2** recites "wherein the peripheral emulator is programmed to emulate one or more USB peripherals." As acknowledged by the Office Action, Frantz et al. fails to disclose or suggest a peripheral emulator that is programmed to emulate one or more USB peripherals. IBM Technical discloses a microprogram for emulating multiple input/output devices, but likewise fails to disclose or suggest that the microprogram emulates one or more USB peripherals. For this additional reason, claim 2 is allowable over Frantz et al. and IBM Technical.

As another example, **dependent claim 29** recites "emulating one or more different USB peripherals within the one or more peripheral emulators to create the incoming USB messages." As acknowledged by the Office Action, Frantz et al. fails to disclose or suggest emulating one or more different USB peripherals within the one or more peripheral emulators to create the incoming USB messages. IBM Technical discloses a microprogram for emulating multiple input/output devices, but likewise fails

to disclose or suggest emulating one or more different USB peripherals within the one or more peripheral emulators to create the incoming USB messages. For this additional reason, claim 29 is allowable over Frantz et al. and IBM Technical.

(ii) Moreover, there is no motivation to modify the primary Frantz et al. reference in view of IBM Technical, as proposed in the Office Action. If the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. MPEP § 2143.01. As discussed below, modifying the system of the Frantz et al. patent as proposed in the Office Action would render it unsatisfactory for its intended purpose. Accordingly, it would not have been obvious to modify the Frantz et al. patent in view of IBM Technical, as set forth in the Office Action.

The Office Action asserts that it would have been obvious to modify the system of Frantz et al. in view of the teachings of IBM Technical, apparently by replacing the management console and attached peripheral devices with a second computer that emulates multiple input/output devices. According to the Office Action, this would have been obvious because an ordinary artisan needing to test a first computer communicating with a USB peripheral device across a network, where the peripheral device was not yet available, would have emulated the USB peripherals and used the art of Frantz et al. and IBM Technical to perform the test. Applicants respectfully disagree.

Modifying Frantz et al. as proposed in the Office Action would render the invention of Frantz et al. unfit for its intended purpose and, therefore, would not have been obvious to one of ordinary skill in the art. As described in column 1, lines 34-38 of

Frantz et al., "[t]his invention involves the controlling of a personal computer or server using a virtual management console that is remotely located from the computer or server being managed." This allows the server to send and receive data from the peripherals at the management console, as if the peripherals were locally connected to the host computer (Abstract; col. 4, lines 42-47). If the system of Frantz et al. were modified by replacing the management console and attached peripheral devices with an input/output device emulator, the system would no longer be able to perform its intended purpose of allowing the server to send and receive data from the peripherals at the management console. Thus, one of ordinary skill in the art would not have been motivated to modify the system of Frantz et al. in such a manner.

All of the pending claims are rejected over the combination of Frantz et al. and IBM Technical (with some of the claims being rejected over one or more additional references). For the reasons discussed above, the combination relied on throughout the Office Action is improper and should not have been made. Applicant respectfully requests reconsideration of the cited combination, and withdrawal of all §103 rejections including the combination of Frantz et al. and IBM Technical.

2. **Claims 3, 5, 9, and 10** were rejected under 35 U.S.C. § 103(a) as being obvious over Frantz et al. and IBM Technical in view of Universal Serial Bus (USB), "Device Class Definition for Human Interface Devices (HID)" (USB Device), and further in view of Universal Serial Bus Specification, Rev. 1.1 (USB Spec). This rejection is respectfully traversed.

Claims 3, 5, 9, and 10 depend from independent claim 1 and, therefore, include all of the features of that claim.

USB Device “describes the Human Interface Device (HID) class for use with Universal Serial Bus (USB)” (page 1, section 2.1).

USB Spec describes four USB transfer types, including isochronous transfers and bulk transfers.

However, neither USB Device nor USB Spec remedies the deficiencies in Frantz et al. and IBM Technical noted above with respect to independent claim 1.

Accordingly, claims 3, 5, 9, and 10 are allowable by virtue of their dependency from claim 1, as well as for the additional features that they recite.

3. Claims 6, 7, and 30 were rejected under 35 U.S.C. § 103(a) as being obvious over Frantz et al. and IBM Technical in view of “Code Complete, A Practical Handbook of Software Construction” (McConnell). This rejection is respectfully traversed.

Claims 6, 7, and 30 depend from one of independent claims 1 and 28 and, therefore, include all of the features of the respective base claim.

McConnell discloses tests to check for several types of “bad data”, including the wrong kind of data (invalid data) (page 603), and for several types of “good data”, including the maximum normal configuration (page 604).

However, McConnell fails to remedy the deficiencies in Frantz et al. and IBM Technical noted above with respect to independent claims 1 and 28.

Accordingly, claims 6, 7, and 30 are allowable by virtue of their dependency from claims 1 and 28, respectively, as well as for the additional features that they recite.

For example, **dependent claim 6** recites that “the general-purpose computer is further programmed to generate USB response messages that test the in-test host with ranges of USB peripheral parameters”; **dependent claim 7** recites that “the general-purpose computer is further programmed to generate abnormal USB response messages in order to test the in-test host with such abnormal USB response messages”; and **dependent claim 30** recites “creating abnormal USB response messages in response to the packaged USB command messages and packaging said abnormal USB response messages in the response data packets in order to test the in-test host’s ability to handle such abnormal USB response messages.”

The Office Action acknowledges that Frantz et al. lacks these features, but asserts that they are taught by one or more of IBM Technical and McConnell. However, Applicants respectfully submit that neither IBM Technical nor McConnell discloses or suggests at least the foregoing features of dependent claims 6, 7, and 30. Accordingly, claims 6, 7, and 30 are allowable for these additional reasons.

4. **Claim 8** was rejected under 35 U.S.C. § 103(a) as being obvious over Frantz et al. and IBM Technical in view of USB Specs and Computer Networks, Third Edition (Tanenbaum). This rejection is respectfully traversed.

Claim 8 depends from independent claim 1 and, therefore, includes all of the features of that claim.

USB Spec describes four USB transfer types, including isochronous transfers and bulk transfers.

Tanenbaum discloses a set of transport primitives, including socket primitives used in Berkeley UNIX for TCP.

However, USB Spec and Tanenbaum fail to remedy the deficiencies in Frantz et al. and IBM Technical noted above with respect to independent claims 1 and 28.

Accordingly, claim 8 is allowable by virtue of its dependency from claim 1, as well as for the additional features that it recites.

For example, **dependent claim 8** recites that "a particular USB command message is designated for a particular one of a plurality of different emulated peripheral devices; ...the operating logic maintains a correspondence between emulated peripheral devices and logical ports; and the operating logic sends said particular USB command message to one of the logical ports that corresponds to said particular one of the plurality of different emulated peripheral devices."

The Office Action acknowledges that Frantz et al. lacks these features, but asserts that they are taught by one or more of IBM Technical, USB Specs, and Tanenbaum. However, Applicants respectfully submit that none of these documents discloses or suggests the foregoing features of dependent claim 8. Accordingly, claim 8 is allowable for these additional reasons.

5. **Claims 13, 14, 32, and 33** were rejected under 35 U.S.C. § 103(a) as being obvious over Frantz et al. and IBM Technical in view of Tanenbaum. This rejection is respectfully traversed.

Claims 13, 14, 32, and 33 depend from one of independent claims 1 and 28 and, therefore, include all of the features of the respective base claim.

Tanenbaum discloses a set of transport primitives, including socket primitives used in Berkeley UNIX for TCP.

However, Tanenbaum fails to remedy the deficiencies in Frantz et al. and IBM Technical noted above with respect to independent claims 1 and 28.

Accordingly, claims 13, 14, 32, and 33 are allowable by virtue of their dependency from claim 1, as well as for the additional features that they recite.


Conclusion

For at least the foregoing reasons, claims 1-14 and 28-33 are in condition for allowance. Applicants respectfully request reconsideration and withdrawal of the § 103 rejections, and an early notice of allowance.

If there are any issues that would prevent allowance of this case, the Examiner is requested to contact the undersigned attorney to resolve them.

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Respectfully Submitted,

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